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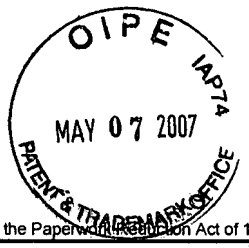

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Examiner Name	V. S. Chang
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Date	May 7, 2007	Reg. No.	33,497

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Attorney Docket No. EIC-001
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICANTS:	Michael D. Gilbert		
SERIAL NO.:	09/352,976	GROUP NO.:	1771
FILING DATE:	July 14, 1999	EXAMINER:	Victor S. Chang
TITLE:	Electrically Disbonding Materials		

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REPLY BRIEF

Grounds of Rejection Addressed Herein

This reply brief is submitted pursuant to 37 C.F.R. §41.41 in reply to the Examiner's Answer of March 8, 2007 (the "Answer"). In particular, this brief addresses the following points raised or erroneously relied upon by the Examiner in connection with the patentability of Appellant's claims:

- The Examiner's mistaken reliance on the fact that the present claims are not limited to metal conductors;[1]
- The Examiner's erroneous contention that Moulton's use of an adhesion promoter implies the presence of a faradaic reaction;[2]
- The Examiner's improper dismissal of the declaration of A.C. Makrides;[3] and
- The Examiner's confusion between electronic and ionic conductivity, which leads him to the erroneous conclusion that Moulton discloses compositions within the present claims.[4]

For the reasons that follow, we reiterate our contention that neither Moulton nor Koga discloses or even suggests compositions within the present claims, and that the Examiner's reliance on these references reflects a fundamental misunderstanding of the invention and of basic electrochemical principles.

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[1] Answer at pg. 8.
[2] *Id.*
[3] *Id.* at pp. 8-9.
[4] *Id.* at pg. 9.

Arguments

I. It is Irrelevant That the Present Claims Are Not Limited to Metal Conductors

In the Answer, the Examiner asserts that "the independent claims of present invention merely recite 'electrically conductive surface,' therefore regardless whether Moulton teaches a metal foil or a conductive plastic foil, Moulton's disclosure reads on [sic] the instant invention as claimed[.]" It is certainly true that the present claims are not limited to metal conductors. But the point raised in our primary brief relates not to claim coverage, but to the teaching of Moulton. Specifically, Moulton's reference to plastic foil conductors and the contrast he makes with metal foil conductors simply confirms that a faradaic reaction — which is required by the present claims — does not take place.

This is because the swelling problem addressed by Moulton is, as Moulton himself recognizes, peculiar to the plastic foils he discloses. And since a faradaic reaction would affect metal or plastic foils, a faradaic reaction cannot account for the adhesion problems Moulton addresses. Indeed, the mere fact that Moulton is only concerned with contact between solvent (not electrolyte) and the current collector itself reflects the absence of a faradaic reaction, which requires electrolyte.

Moulton simply does not teach any bond-weakening faradaic reaction at the interface of either plastic or metal current collectors. The Examiner's mischaracterization of Moulton is best refuted by Moulton himself:

Examiner on Moulton	Moulton on Moulton
Appellant is reminded that the independent claims of present invention merely recite "electrically conductive surface", therefore regardless whether Moulton teaches a metal foil or a conductive plastic foil, Moulton's disclosure reads on [sic] the instant invention as claimed, and appellant's remarks appears [sic] to be pointless. Further, Moulton teaches that typical current collector is a metal foil or a conductive plastic foil, and nowhere has Moulton implicitly disclosed that metal foil conductors do not suffer from bond-weakening process[.][5]	Notwithstanding the benefits of using current collectors in electrochemical cells, metal foil current collectors are heavier than conductive plastic foil current collectors and adversely increase the weight of the battery. On the other hand, when conductive plastic foils are used as the current collector, they are in direct contact with a composite electrode and are suspectable [sic] to swelling due to contact of the current collector with the electrolytic solvent found in the electrode. Such swelling adversely affects the performance of the battery.[6] * * * This invention is directed to the discovery that the inclusion of a layer of electrically-conducting adhesion-promoter to the surface of conductive plastic foil current collector provides a means to both increase the adherence of the electrode to the foil and to retard contact of the electrolytic solvent with the plastic foil.[7]

Clearly, the benefits obtained by Moulton are specific to plastic and do not involve a bond-weakening, faradaic process.

II. Moulton's Use of an Adhesion Promoter Does Not Imply the Presence of a Faradaic Reaction

The Examiner believes that "Moulton's teaching of the need for an adhesion promoter" implies that a bond-weakening faradaic reaction must be taking place.[8] But of course, the need

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[5] Answer at pg. 8.
[6] Moulton, col. 1, lines 47-57.
[7] *Id.* at col. 2, lines 3-8.
[8] Answer at pg. 8.

for adhesion may arise for numerous reasons other than the occurrence of a faradaic reaction. And in fact, Moulton himself attributes the problem to the simple presence of a non-adherent surface. The Examiner, however, prefers to disregard Moulton's express teaching in order to maintain his baseless rejections. The Examiner's misguidedness is revealed, once again, by Moulton himself:

Examiner on Moulton	Moulton on Moulton
Moulton's teaching of the need of an adhesion promoter to retard the contact of the electrolyte solvent in the composite electrode with the current collector infers [sic] that the adhesion (bond) at interface weakens (disbondable) over electrochemical (faradaic) reactions during battery use.[9]	Additionally, some conductive plastic foil current collectors possess a relatively non-adherent surface which retards the attachment of a composite electrode to the surface of the current collector. Specifically, composite electrodes are typically prepared from a paste which is applied onto the surface of the current collector by conventional means such as extrusion and then cured to form a solid composite electrode. When the surface of the current collector is non-adherent, then during application of a paste onto the foil, the paste can become dislodged from the foil. In turn, after curing, such dislodgement will result in defects in collecting current from that cell.[10]

III. The Examiner's Dismissal of the Declaration of A.C. Makrides Reflects a Misunderstanding of Basic Physics

In dismissing the declaration submitted by Dr. Makrides, the Examiner contends that "Makrides fails to provide any explanation why the conductivity of an electrode necessarily cannot support a faradaic reaction at the interface between electrode and current collector."[11] In fact, a declaration is not even necessary to state this simple physical reality: the potential difference between two electronic conductors in contact is zero. Since faradaic reactions occur

[9] *Id.*
[10] Moulton at col. 1, line 57 to col. 2, line 2.
[11] Answer at pg. 9.

at interfaces because of a (nonzero) potential difference between the two phases, they cannot occur between an electrode and its current collector.[12]

The Examiner's rejection of basic physics in order to salvage Koga as a relevant reference is, obviously, untenable. Once again, the Examiner purports to see what the patentee himself does not. As explained in our primary brief, *Koga himself* attributes bond weakening to mechanical effects and to general binder decomposition.[13] Koga does not attribute it to a faradaic reaction because there is no such reaction. The Examiner, nonetheless, is determined to believe that a faradaic reaction is taking place, noting that "Koga's electrode is necessarily an electronic conductor as well."[14] In fact, the Examiner has drawn precisely the wrong conclusion from his own observation: as explained above, the presence of an electronic conductor in contact with the current collector *precludes* a faradaic reaction rather than mandating one, as the Examiner would have it.

IV. The Examiner's Confusion of Ionic with Electronic Conductivity Leads Him to Improperly Equate Moulton's Compositions with Those Claimed Herein

One source of the Examiner's misunderstanding regarding faradaic reactions is his fundamental confusion between electronic and ionic conductivity. According to the Examiner, "[A]ppellant appears to indicate the composition of the instant invention is not an electronic conductor, such a statement is clearly incommensurate with the claimed composition which requires the property of 'sufficient ionic conductivity'."[15] The Examiner appears not to appreciate the difference between ionic and electronic conductivity, and the principle that an ionic conductor *cannot be* an electronic conductor (and vice versa). As a result, the Examiner mistakenly concludes that Moulton's compositions fall within the present claims.

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[12] Koga's electrode, like all electrodes, is an electronic conductor. As such, although it cannot support a faradaic reaction at the interface with its current collector, it can support a faradaic reaction at the interface with electrolyte – that is what makes it an electrode. The present claims are not concerned with indirect effects from a faradaic reaction occurring somewhere in a system but are specific to a faradaic reaction at a bond formed between the composition and an electronically conductive surface. No such reaction can take place between an electrode and its current collector.
[13] *See* Appellant's primary brief at pg. 9, *citing* Koga at col. 1, lines 48-60.
[14] Answer at pg. 9.
[15] Answer at pp. 9-10.

As is well understood, conduction by an electronic conductor (e.g., a metal) is due to drift of (more or less) free electrons in a lattice of fixed positive ions under an applied electric field. Metallic conductivities at room temperature are very high. The conductance of electrolytes, on the other hand, arises from the migration of ions under an applied field, and ionic conductivity is orders of magnitude lower than electronic conductivity. A claim reciting ionic conductivity means that there is no electronic conductivity. Accordingly, the Examiner's recognition that "Moulton teaches composite electrodes which are electronic conductor [sic]"[16] *should* lead him to realize Moulton's irrelevance to the present claims. But because he incorrectly equates ionic with electronic conductivity, he reaches precisely the wrong conclusion.

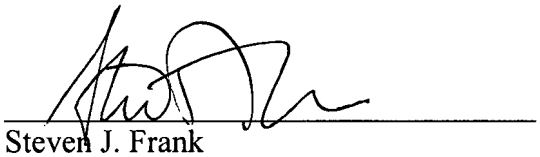
As explained in our primary brief, the present claims cover compositions with specific electrochemical characteristics — disbonding by a faradaic reaction — that are simply not present in Moulton or Koga. It is clear that the Examiner's erroneous perception to the contrary stems from misunderstanding of basic of electrochemical principles.

Conclusion

Appellants respectfully submit that the Examiner has failed to meet his burden of establishing that the limitations of the present claims are met by the references of record — alone or in combination. Appellants therefore request the Board of Patent Appeals and Interferences to reverse the Examiner's rejections and direct that this application be passed to issuance.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 07-1700.

Respectfully submitted,



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[16] Answer at pg. 3.